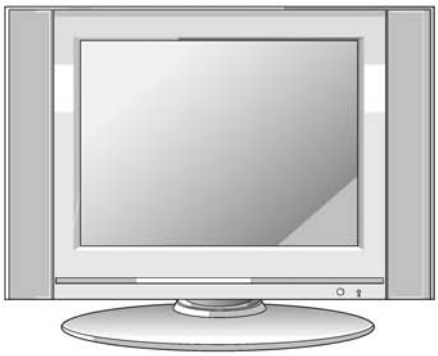
website:http://biz.LGservice.com
e-mail:http://www.LGEservice.com/techsup.html

LCD TV
SERVICE MANUAL

CHASSIS : ML-041B

MODEL : RZ-20LA90/RT-20LA90

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Replacement Parts List.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

X-RAY Radiation

Warning:

The source of X-RAY RADIATION in this TV receiver is the High Voltage Section and the LCD PANEL.
For continued X-RAY RADIATION protection, the replacement panel must be the same type panel as specified in the Replacement Parts List.

To determine the presence of high voltage, use an accurate high impedance HV meter.

Adjust brightness, color, contrast controls to minimum.
Measure the high voltage.
The meter reading should indicate
23.5 ± 1.5KV: 14-19 inch, 26 ± 1.5KV: 19-21 inch,
29.0 ± 1.5KV: 25-29 inch, 30.0 ± 1.5KV: 32 inch
If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.

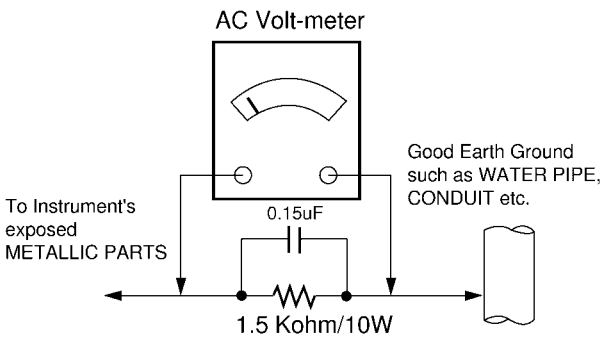
Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.
Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices.* Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500° F to 600° F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
   Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500° F to 600° F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuitboard printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500° F to 600° F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections. **CAUTION:** Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to ML-041B chassis.

2. Requirement for Test

Testing for standard of each part must be followed in below condition.

(1) Temperature: 25°C ± 2°C
(2) Humidity: 65% ± 10%
(3) Power: Standard input voltage (AC 100-240V, 50/60Hz)
(4) Measurement must be performed after heat-run more than 30min.
(5) Adjusting standard for this chassis is followed a special standard.

3.General Specification

No.	Item	Specification	Remark
1	Maker	LPL	LPL
	Type	TFT Color LCD Module	
	ActiveDisplay Area	20.1 inches(510mm) diagonal	
	Pixel Pitch [mm]	0.6375mm(H)x0.6375mm(V)xRGB	
	Electrical Interface	TTL	
	Color Depth	8BIT, 16,777,216 colors	
	Size [mm]	450(H)x 348.7(V)x20(D)	
	Surface Treatment	Glare, Hard Coating(3H)	
	Operating Mode	Normally Black	
	Back light Unit	6 CCFL(6 lamps)	
	R/T Typ.	16ms(R.T.:7/10ms + F.T.:18/20ms)	
2	Maker	CMO	CMO
	Type	TFT Color LCD Module	
	ActiveDisplay Area	20.1 inches(510.00mm) diagonal	
	Pixel Pitch [mm]	0. 2125mm(H)x0.6375mm(V)xRGB	
	Electrical Interface	TTL	
	Color Depth	8-BIT 16,777.216 Colors	
	Size [mm]	448.6(H)x339.6(V)x25(D)	
	Surface Treatment	Anti Glare, Hard Coating(3H)	
	Operating Mode	Normally Black	
	Back light Unit	6 CCFL(6 lamps)	
	R/T Typ.	16ms(R.T.:5/7ms + F.T.:11/14ms)	

4. Feature and Function

No.	Item	Specification	Remark
1	Teletext	TOP, FLOF	Top(option)
2	REMOCON	NEC Code	PAL/ NTSC
3	CVBS VIDEO Input	1	Rear
4	S-VIDEO Input	1	Rear
5	Component input	1	Rear (option:NTSC, Non-EU)
6	PERI TV Connector	Full SCART : 1	Rear (option:EU)
7	H/p input	1	
8	RS-232	1	Only Commercial Model
9	Discrete IR	1	Only Commercial Model
10	2 Carrier Stereo	BG, DK	
11	NICAM Stereo	BG, I, LL'	
12	2 Carrier Dual	BG, DK	
13	NICAM Dual	BG, I, LL'	
14	DW(Double Window) Mode	X	
15	MW(Multi Window) Mode	X	
16	Film Mode	X	
17	Noise Reduction	X	
18	Progressive Scan	O	
19	Motion Detection	X	
20	SRS WOW	X	
21	wivel Speaker	X	
22	Ez-pip	X	
23	ARC	X	
24	DRP	X	
25	DCDI	X	
26	HDCP	X	

5.Optical Character

No.	Item	Specification						Remark
					LPL	CMO		
1	Viewing Angle <CR≥10>	R/L, U/D			88/88 88/88	80/80 70/70		
2	Luminance	Luminance(cd/㎡)			450	450		Typical
		Variation			1.3	1.3		MAX/MIN
3	Contrast Ratio				350	500		ALL white/All black
4	CIE Color Coordinates	WHITE	W_X	Typ.	0.289	0.285		
			W_Y	Typ.	0.335	0.293		
		RED	W_r	Typ.	0.692	0.692		
			Y_r	Typ.	0.335	0.332		
		Green	X_g	Typ.	0.289	0.276		
			Y_g	Typ.	0.583	0.601		
		Blue	Xb	Typ.	0.143	0.142		
			Yb	Typ.	0.909	0.075		

6.Engineering Specification

No.	Item	Specification			Remark
1	Power Supply	H/V Sync	Video	Power Consumption	LED Color
	Normal	On/On	Active	≤ 65W	GREEN
	Suspend Mode	Off/Off	Off	≤ 1W	LED
	Cut-off Switch off	-	-	0W	OFF
				PBP SWAP ▶ ON/OFF	
	ITEM	Spectification			Remark
2	D-SUB Pin Configuraion	1: RED 3: Blue 5: S.T(GND) 7: Green GND 9: N.C 11: ID0(GND) 13: H-Sync 15: SCL	2: Green 4: ID2(GND) 6: RED GND 8: Blue GND 10: D-GND 12: SDA 14: V-Sync Shell: GND		For Service Only
3	Control Function	1) Contrast/Brightness 2) H-Position/V-Position 3) Tracking : Clock/ Phase 4) Auto Configure RESET			
4	Comoponent Jack (480i, 480p)	1: Y 3: Pb 5: Pr			Middle east/ NTSC Area
5	D2 Jack (525i, 525p)	1: Y GND 2: Pb 5: Pr 7: LINE1 Ready 9: Line2 11: Line3 13: Line3 ready	2: Y GND 4: Pb GND 6: Pr GND 8: LINE1 10: Line2 Ready 12: SWITCH GND 14: SWITCH		JAPAN Only

6-2.Power

NO	Item	Min	Typ	Max	Unit	Remark
1	AC Power Shut Down Voltage	90		264	V	
2	DC Voltage, Inverter	11.4	12	11.4	V	
3	DC Voltage, LCD Panel	11.4	12	12.6	V	
		4.5	5	4.5	V	
4	DC Voltage, Audio	14.0	15	16.0	V	
5	DC Voltage, Tuner(5)	4.5	5	5.5	V	
6	DC Voltage, Tuning(33)	31	33	35	V	
7	DC Voltage, VCTi(5)	4.5	5	5.5	V	
	DC Voltage, VCTi(8)	7.5	8	8.5	V	
8	DC Voltage, VCTi(3.3)	3.1	3.3	3.5	V	
	DC Voltage, VCTi(1.8)	1.6	1.8	2.0	V	
9	DC Voltage, GM2221 (3.3)	3.1	3.3	3.5	V	
	DC Voltage, GM2221 (1.8)	1.6	1.8	2.0	V	
10	DC Voltage, Digital (3.3)	2.8	3.3	3.8	V	
11	DC Voltage, Digital (5)	4.5	5	5.5	V	

6-3. External Interface

NO	Item	Min	Typ	Max	Unit	Remark	
1.	Video Input Level	0.85	1	1.15	Vpp	EN-50049	
2.	Audio Input Level	0.4	0.5	0.6	V	NTSC:0.4Vrms(Typ)	
3.	Audio Input Frequency Response	0.1		7	KHz		
4.	Audio Input S/N	40			DB		
5.	Audio Input Distortion			2	%		
6.	Audio Input Dynamic Range	2			V		
7.	Video Output Level	0.85	1	1.15	Vpp		
8.	Video Output Frequency Response	3.8			MHz		
9.	Video Output S/N	40			DB		
10.	Audio Output Level	0.4	0.5	0.6	V		
11.	Audio Output Frequency Response	0.1		7	KHz		
12.	Audio Output S/N	40			DB		
13.	Audio Output Distortion			2	%		
14.	Video Input Level, R/G/B	0.6	0.7	0.8	Vpp	75 ohm	
15.	Video Input Level, Component(Y, PB, PR)	0.6	0.7	0.8	Vpp	75 ohm	
16.	RGB Input Resolution, Vertical		480		Pixel	Only 20"	640 Pixel
17.	RGB Input Resolution, Horizontal		640		Pixel		480
18.	RGB Input Horizontal Frequency				KHz	See table 5-5	
19.	RGB Input Frame Rate				Hz	See table 5-5	

6-4. The Others

NO	Item	Min	Typ	Max	Unit	Remark
1	Search Sensitivity			-85	dBm	
2	Soft Ware Functionality Test					LGE Specification
3	REMOCON Working Sensitivity, Straight	0.1		10	m	
4	REMOCON Working Sensitivity, T/B/L/R	0.1		9	m	30 degree
5	Closed Caption Sensitivity			-70	dBm	NTSC ONLY
6	Teletext Sensitivity			-70	dBm	

ADJUSTMENT INSTRUCTION

1. Application Object

This instruction is for the application to the LCD TV.

2. Adjustment

2.1 Adjustment Details

The machine can be adjusted by it self automatically but even for self-adjustment it needs someone to operate it.

2.2 Auto Gain/Offset adjustment

2.2.1 RF Mode adjustment *(RZ-20LA90, RT-20LA90)*

2.2.1.1 Adjustment preparation

- Execution of RF no signal during Heat Run over 30min...

2.2.1.2 Auto Gain/Offset adjustment

- Press IN-START Key by using the Remote Controller (SVC), after converting to Adjustment-Mode, Press VOL+Key consecutively in Scaler Auto gain menu.
- After adjustment is complete, pressing ener key, stores and completes the process

2.2.1 Component Mode adjustment *(Only RT-20LA90)*

2.2.1.1 Adjustment preparation

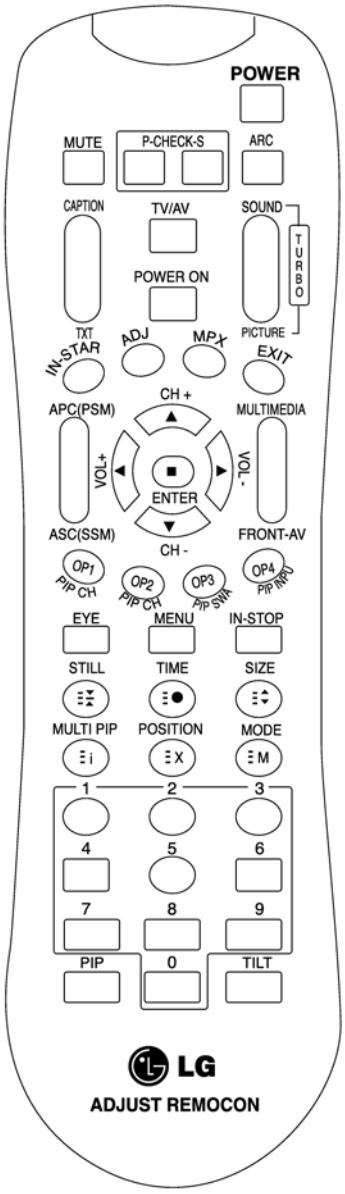
- Execution of RF no signal during Heat Run over 30min...
- The component jack(Y, Pb, Pr) of LCD TV is connected to Y, Pb, Pr Output Signal of Pattern Generator (MSPG-925 SERISE)

2.2.1.2 Auto Gain/Offset adjustment

- Convert to Component Mode in Input-Mode.
- Select MODEL : 228 (480p MODE, Y:100%, Pb/Pr:75%) in Pattern Generator
  Select PATTERN : 33 (Color Bar Pattern signal) in Pattern Generator (MSPG-925 SERISE)
- Press IN-START Key by using the Remote Controller(SVC), after converting to Adjustment-Mode, press VOL+Key consecutively in Auto Gain Menu.
- After adjustment is complete, pressing enter key, stores and completes the process

SVC REMOCON

NO	KEY	FUNTION	REAMARK
1	POWER	To turn the TV on or off	
2	POWER ON	To turn the TV on automatically if the power is supplied to the TV. (Use the POWER key to deactivate): It should be deactivated when delivered.	
3	MUTE	To activate the mute function.	
4	P-CHECK	To check TV screen image easily.	Shortcut keys
5	S-CHECK	To check TV screen sound easily	Shortcut keys
6	ARC	To select size of the main screen (Normal, Spectacle, Wide or Zoom)	Shortcut keys
7	CAPTION	Switch to closed caption broadcasting	
8	TXT	To toggle on/off the teletext mode	
9	TV/AV	To select an external input for the TV screen	
10	TURBO SOUND	To start turbo sound	
11	TURBO PICTURE	To start turbo picture	
12	IN-START	To enter adjustment mode when manufacturing the TV sets.	Use the AV key to enter the screen W/B adjustment mode.
		To adjust the screen voltage (automatic): In-start →mute →Adjust →AV(Enter into W/B adjustment mode)	
		W/B adjustment (automatic): After adjusting the screen →W/B adjustment →Exit two times (Adjustment completed)	
13	ADJ	To enter into the adjustment mode. To adjust horizontal line and sub-brightness.	
14	MPX	To select the multiple sound mode (Mono, Stereo or Foreign language)	
15	EXIT	To release the adjustment mode	
16	APC(PSM)	To easily adjust the screen according to surrounding brightness	
17	ASC(SSM)	To easily adjust sound according to the program type	
18	MULTIMIDIA	To check component input	Shortcut keys
19	FRONT-AV	To check the front AV	Shortcut keys
20	CH±	To move channel up/down or to select a function displayed on the screen.	
21	VOL±	To adjust the volume or accurately control a specific function.	
22	ENTER	To set a specific function or complete setting.	
23	PIP CH-(OP1)	To move the channel down in the PIP screen. To use as a red key in the teletext mode	
24	PIP CH+(OP2)	To move the channel in the PIP screen To use as a green key in the teletext mode	
25	PIP SWAP(OP3)	To switch between the main and sub screens To use as a yellow key in the teletext mode	
26	PIP INPUT(OP4)	To select the input status in the PIP screen To use as a blue key in the teletext mode	
27	EYE	To set a function that will automatically adjust screen status to match the surrounding brightness so natural color can be displayed.	
28	MENU	To select the functions such as video, voice, function or channel.	
29	IN-STOP	To set the delivery condition status after manufacturing the TV set.	
30	STILL	To halt the main screen in the normal mode, or the sub screen at the PIP screen. Used as a hold key in the teletext mode (Page updating is stopped.)	
31	TIME	Displays the teletext time in the normal mode Enables to select the sub code in the teletext mode	
32	SIZE	Used as the size key in the PIP screen in the normal mode Used as the size key in the teletext mode	
33	MULTI PIP	Used as the index key in the teletext mode (Top index will be displayed if it is the top text.)	
34	POSITION	To select the position of the PIP screen in the normal mode Used as the update key in the teletext mode (Text will be displayed if the current page is updated.)	
35	MODE	Used as Mode in the teletext mode	
36	PIP	To select the simultaneous screen	
37	TILT	To adjust screen tilt	Shortcut keys
38	0~9	To manually select the channel.	

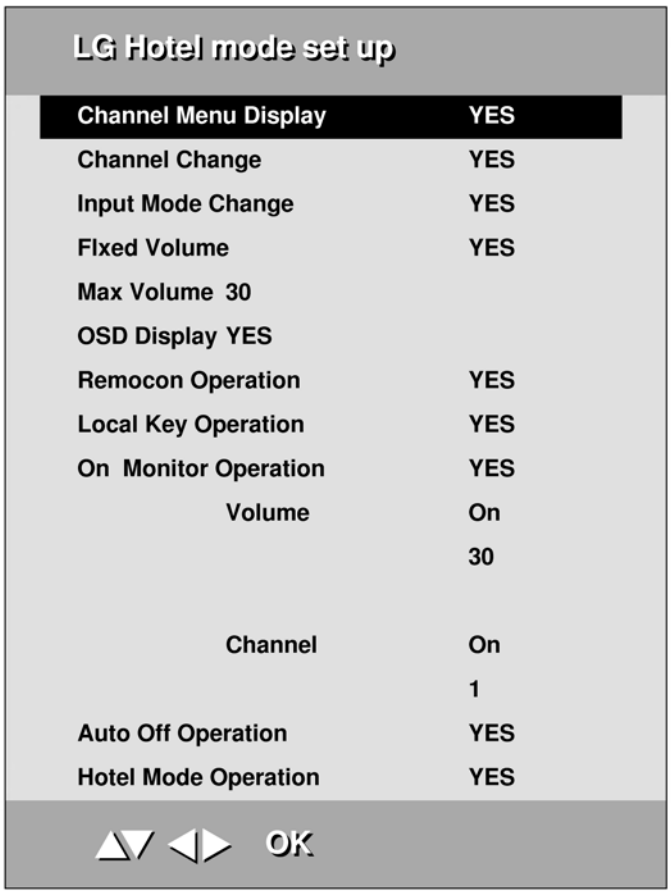


HOTEL MODE

1. Hotel Option Configuration

When using the service remote control, press the In-Start key, and when using the user remote control, press the menu of the local key and the menu of the user remote control simultaneously for 10 seconds to enter the service mode.

Press the menu key one more time with the service mode OSD displayed and move th the hotel option setup page to set up.



1.1. Channel Menu Display

- Decide to enter 'Channel Menu' or not in the 'Main Menu' by setting 'Channel Menu Display' as Yes(Enter Possible) or No(Enter Impossible) on the "LG Hotel Mode" OSD.

1.2. Channel Change

- Decide to change channel or not by setting 'Channel Change' as Yes(Change Possible) or No(Change Impossible) when present source is TV.
- When 'Channel Change' is set to No(Change Impossible), Channel Key, Numeral Key, List Key, Q.View Key doesn't work and entering 'Channel Menu' in the Main Menu OSD is impossible.
- When 'Channel Change' is set to Yes(Change Possible), Channel Key, Numeral Key, List Key, Q.View Key does work and entering 'Channel Menu' in the Main Menu OSD is possible.
- When 'Channel Change' is set to No(Change Impossible), 'Channel' item in 'On Time' menu will be fixed.
- When 'Channel Change' is set to No(Change Impossible), entering 'Channel Menu' in the 'Main Menu' OSD is impossible regardless of 'Channel Menu Display' item.

1.3. Input Source Change

- Decide to change input source or not by setting 'Input Source Change' as Yes(Change possible) or No(Change impossible).
- When 'Input Source Change' is set to No(Change impossible), TV/AV key and Multimedia key doesn't work, and entering 'Input' item in the 'Main Menu OSD' is impossible.
- When 'Input Source Change' is set to No(Change impossible), user's input (pressing Channel key, numeral key, List key, Q.View key in all Input source except TV source) doesn't work and when entering 'Channel Menu' item in the 'Main Menu OSD' except TV mode doesn't accepted. Because entering 'Channel Menu' item makes present mode as TV mode even though present mode is not TV mode. for the function that turns to TV mode doesn't work.
- When 'Input Source Change' is set to Yes(Change possible), then changing input source is available.
- When 'Input Source Change' is set to No(Change Impossible), TV set always turns on fixed input source and volume information regardless of already set channel information.
- When 'Input Source Change' is set to No(Change Impossible), entering 'Channel Menu' except TV mode doesn't possible regardless of 'Channel Change' or 'Channel Menu Display' item.

1.4. Fixed Volume

- Decide to fix volume or not by setting 'Fixed Volume' as Yes(Change possible) or No(Change impossible).
- When 'Fixed Volume' is set to Yes(Set), it fixed present volume and volume key doesn't work.
- When 'Fixed Volume' is set to Yes(Set), volume doesn't change during 'Mute On' but release mute.
- When 'Fixed Volume' is set to No(Not Set), user can change volume.
- In the case of both 'Fixed Volume' and 'On Time' is set to Yes(Set), but just the value is different, then Fixed Volume value has priority.
- When 'Fixed Volume' is set to Yes(Set), user cannot select 'Max Volume' item.
- When 'Fixed Volume' is set to Yes(Set), 'On Time' menu's Volume item fixed to present volume.

1.5. Max Volume

- Decide 'Max Volume' between changing range 0 ~ 100.
- When 'Max Volume' is set, user can change up to set volume value.
- In the case of 'Fixed Volume' is set to Yes, 'Max Volume' item cannot be selected.
- When 'Max Volume' is set, volume just goes up to the 'Max Volume' value in 'On Time Menu'.

1.6. OSD Display

- Decide to display OSD or not by setting 'OSD Display' as Yes(Mark) or No(No Mark).
- When 'OSD Display' is set to No(No Mark), just Channel OSD and STEREO OSD doesn't display.

1.7. Remocon (Remote Control) Operation

- Decide to operate Remote Control or not by setting "Remocon Operation" as Yes(Work) or No(Do Not Work).
- When "Remocon Operation" is set to No(Do Not Work), all remocon key doesn't work include Power Key.
- When "Remocon Operation" is set to No(Do Not Work), In-start key and In-stop key still work.
- When "Remocon Operation" is set to No(Do Not Work), 'Remocon Operation' working in service mode is available.
- When "Remocon Operation" is set to Yes(Work), all Remocon keys work properly.

1.8. Local Key Operation

- Decide to operate 'Local Key' or not by setting "Local Key Operation" as Yes(Work) or No(Do Not Work).
- When 'Local Key Operation' is set to No(Do Not Work), all Local Key doesn't work include Power Key.
- When 'Local Key Operation' is set to No(Do Not Work), Local Key working in service mode is still available.
- When 'Local Key Operation' is set to Yes(Work), all Local Key working is available.
- When set both 'Local Key' and 'Remocon Operation' as No(Do Not Work), Power key of Remocon work as exceptional case.

1.9. On Monitor Operation

- Decide to set Channel and Volume value or not those are displaying when Power On by setting 'On Monitor Operation' as Yes(Work) or No(Do Not Work).
- When 'On Monitor Operation' is set to No(Do Not Work), user cannot enter inside of 'channel' and 'volume' item.
- When 'On Monitor Operation' is set to Yes(Work), user can enter inside of menu and set value.
- When 'Channel' item of 'On Monitor Operation' is set to No(Do Not Work), and 'On Monitor Operation' is set to Yes(Work), then TV saves present input source and always turn on as the saved input source when turn on. If user enters Hotel Mode as other input source that user wants (except TV mode), and set 'Channel' item as Yes(Work), then it will work.
- When 'On Monitor Operation' is set to No(Do Not Work), TV will be turned on as last memorized channel or input source.

1.10. Channel

- Decide to turn on TV as set channel or last memorized channel or not by setting 'Channel' as On(Work) or Off(Do Not Work).
- When 'On Monitor Operation' is set to Yes(Work), then user can enter 'Channel' and set the value.
- When 'On Monitor Operation' is set to On(Work), setting 'Channel' value of "On Monitor Operation' is possible and TV always turns on as set 'Channel' value.
- When 'On Monitor Operation' is set to Off(Do Not Work), setting 'Channel' value of 'On Monitor Operation' is impossible and TV turns on last memorized channel.
- If user wants to turn on by other Input source except TV, change Input source as you want and enter to 'Hotel Mode', then select 'Channel' item as Off(Do Not Work) or Do Not select this item On(Work) from the beginning.
- In the case of both 'Channel' and 'On Time' is set, but just the value is different, then 'Channel' value has priority.

1.11. Auto Off Operation

- If there's no key input during 2 hours after turn on TV by 'Power On' function of the 'On Time', then turn off TV by 'Auto Off' function of 'Time Menu'. This item decide to turn on TV by 'Auto Off Operation' regardless of 'Auto off' function of 'Time Menu' or not by setting as Yes(Work) or No(Do Not Work).
- When 'Auto Off Operation' is set to Yes(Work), 'Auto Off Operation' work as configuration.
- When 'Auto Off Operation' is set to No(Do Not Work), 'Auto Off Operation' Do Not work regardless of configuration.

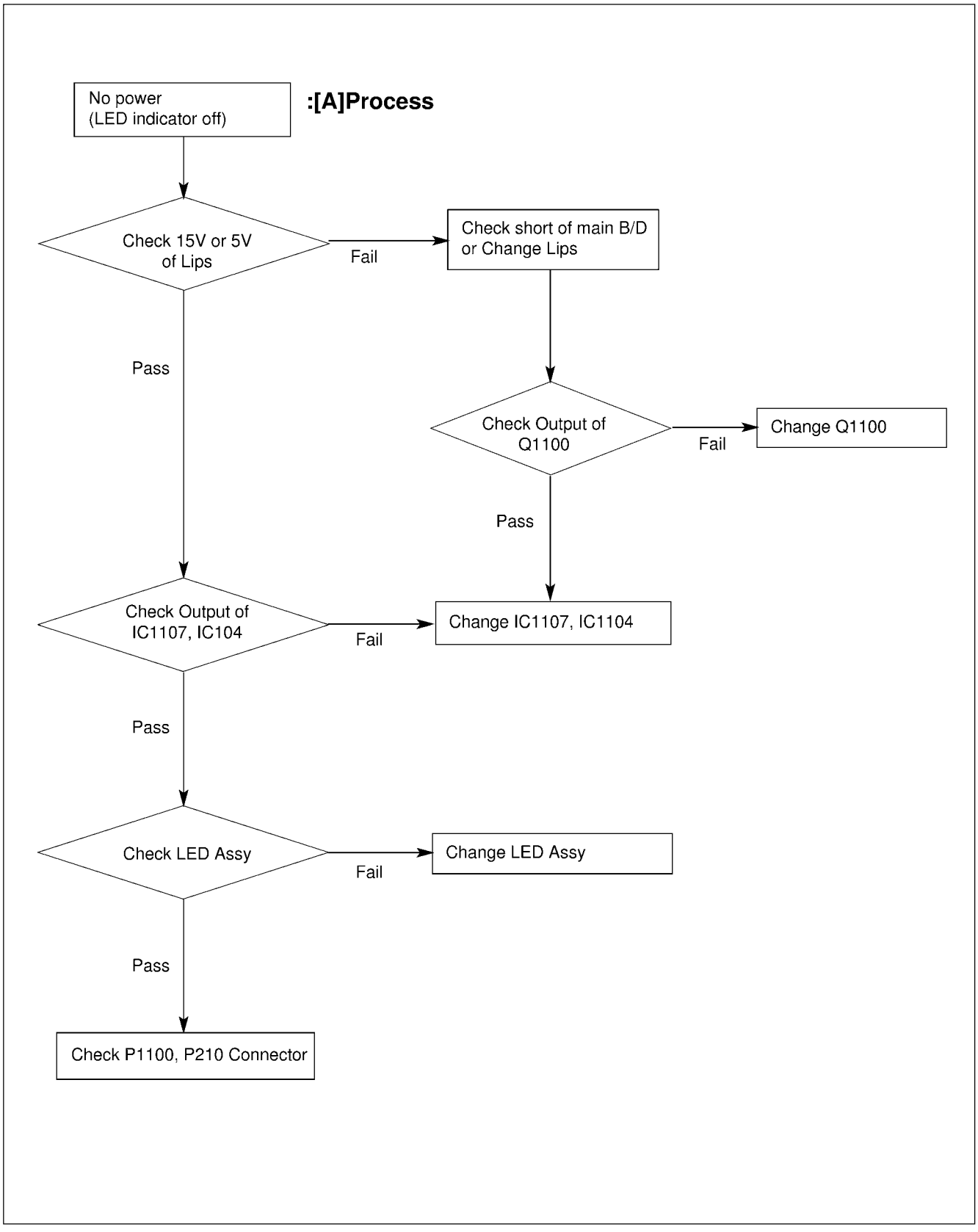
1.12. Hotel Mode Operation

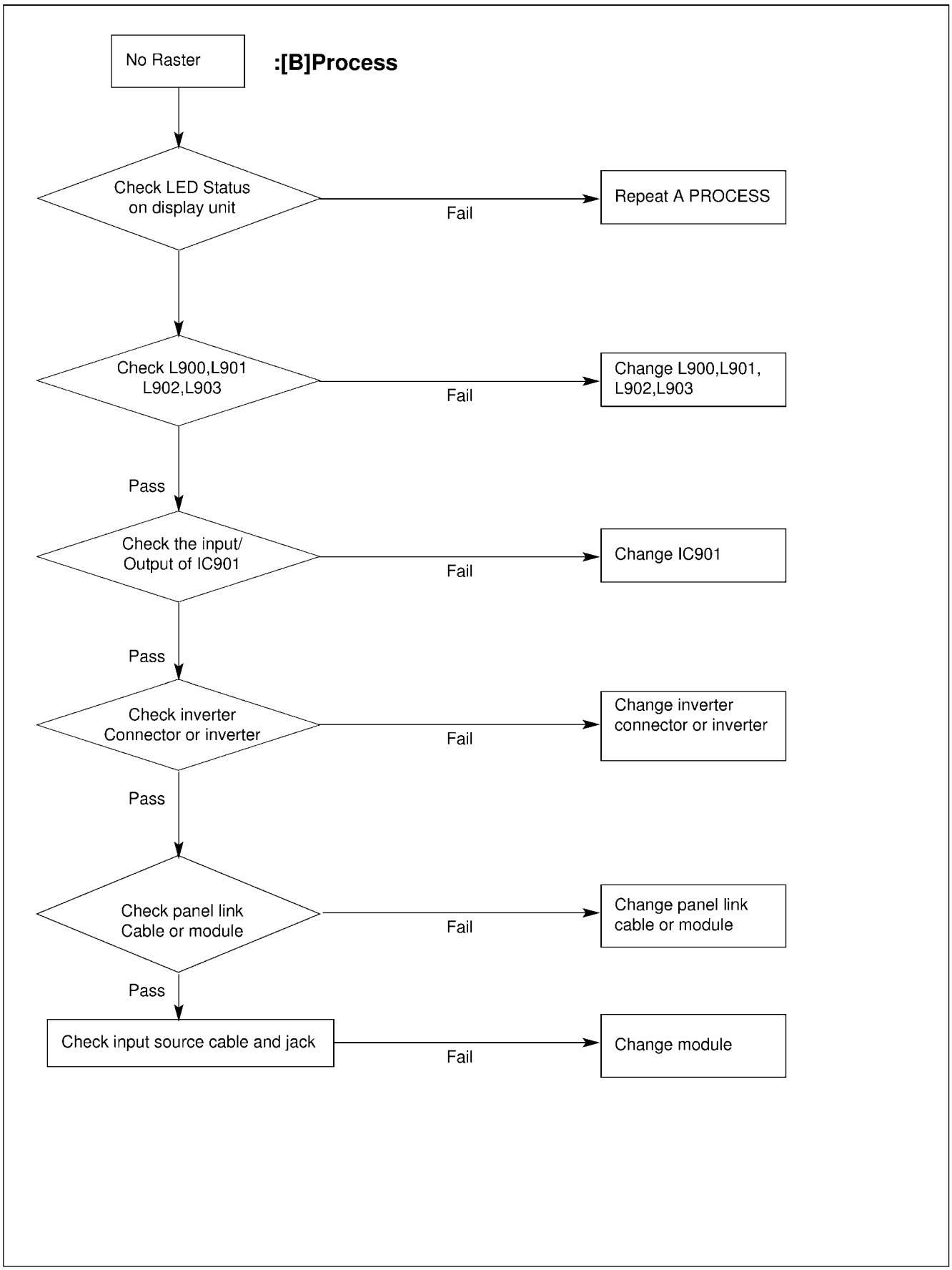
- Decide to work all functions of 'Hotel Mode Operation' or not by setting 'Hotel Mode Operation' as Yes(Work) or No(Do Not Work).
- When 'Hotel Mode Operation' is set to Yes(Work), all functions of Hotel Mode apply.
- When 'Hotel Mode Operation' is set to No(Do Not Work), all functions of Hotel Mode Do Not apply.

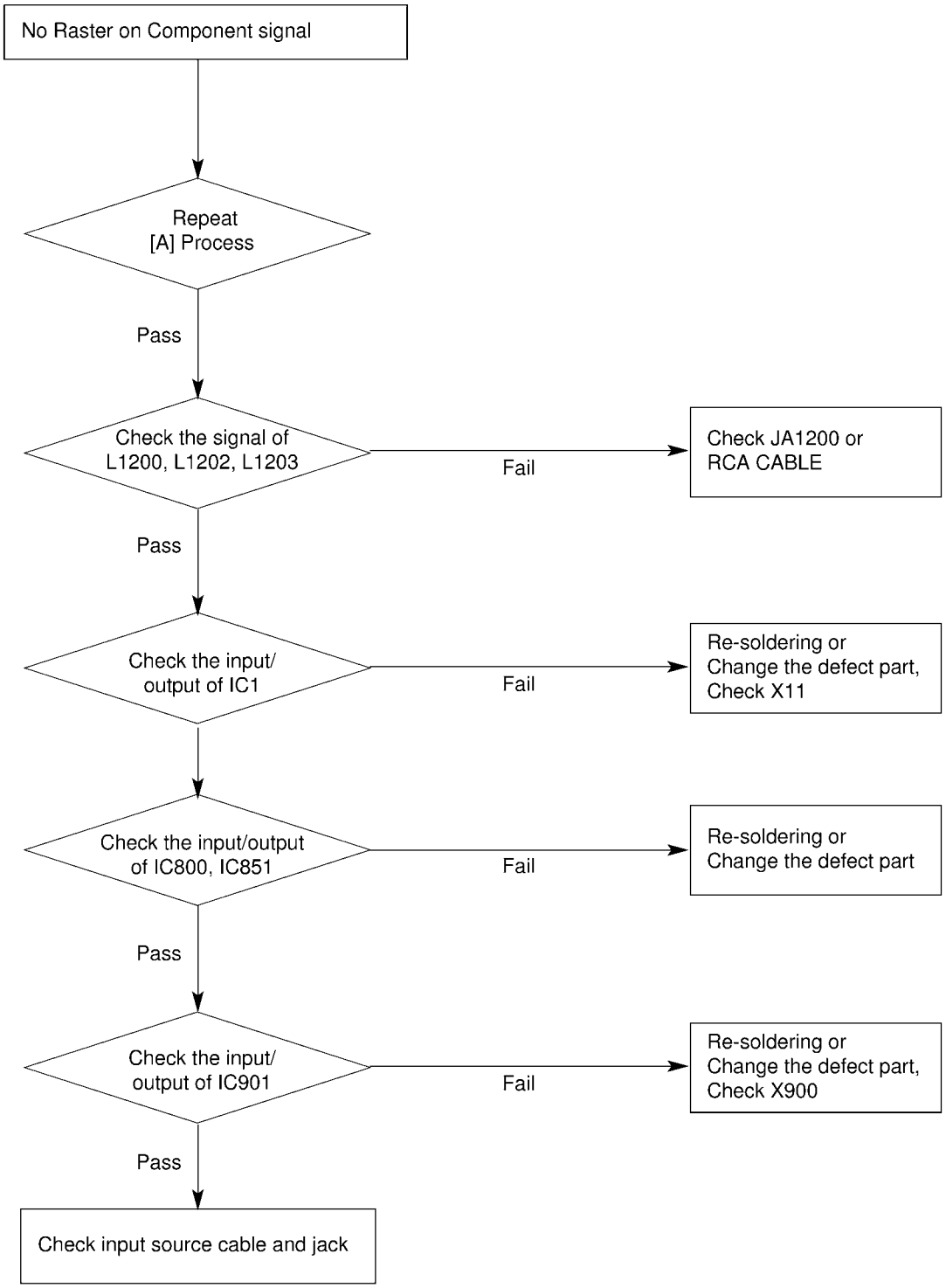
2. Initial Configuration and Configuration Detail

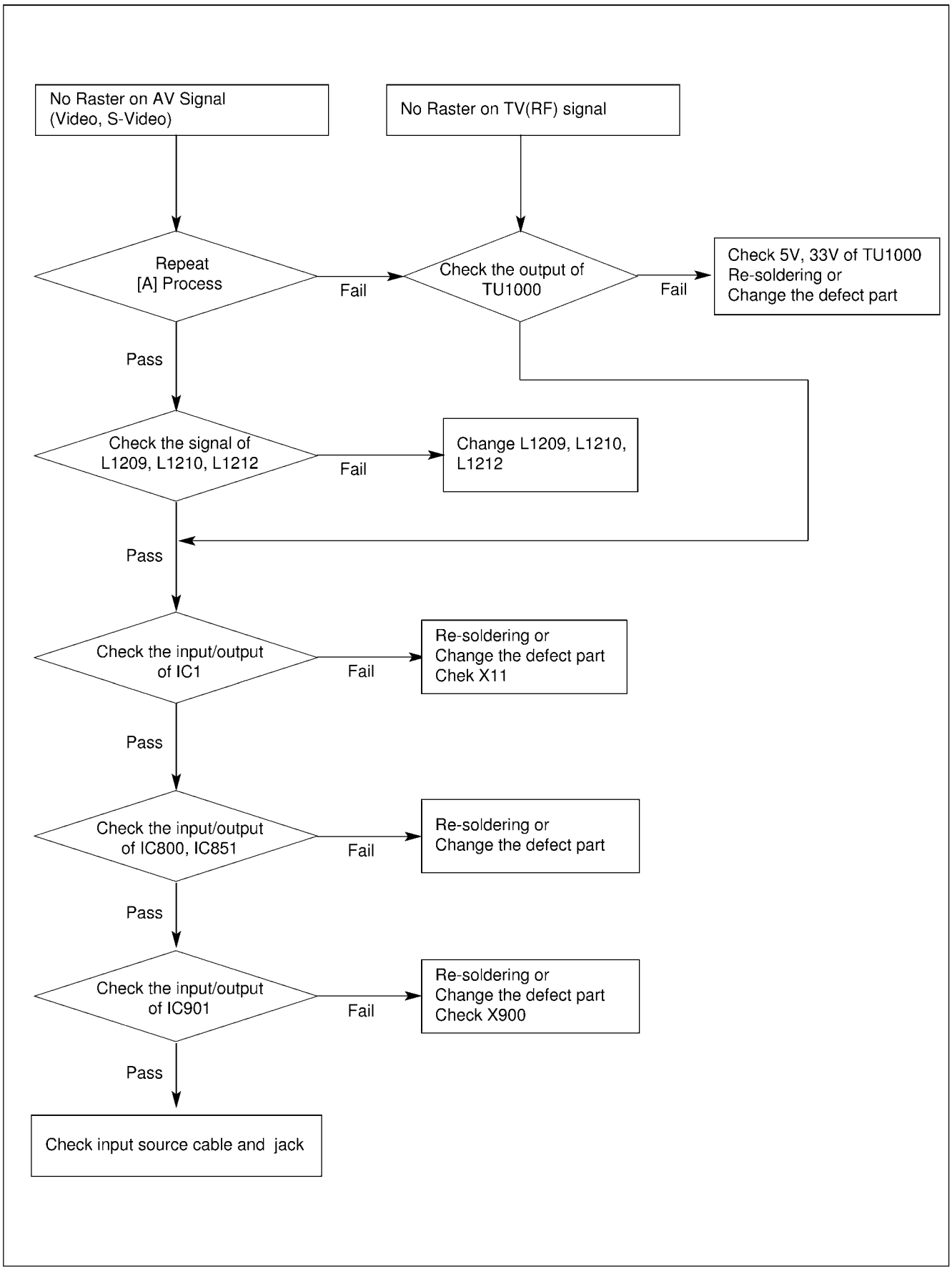
Setting Item	Activated	Deactivated	Default
Channel Menu	Yes	No	Yes
Channel Change	Yes	No	Yes
Input Mode Change	Yes	No	Yes
Fixed Volume	Yes	No	No
Max Volume	0 ~ 100		100
OSD Display	Yes	No	Yes
Remote Operation	Yes	No	Yes
Local Key Operation	Yes	No	Yes
On Monitor Operation	Yes	No	No
Volume	On	Off	Off
Volume Level	0 ~ 100		30
Channel	On	Off	Off
Channel Number	0 ~ 99		1
Auto Off Operation	Yes	No	Yes
Hotel Mode Operation	Yes	No	No

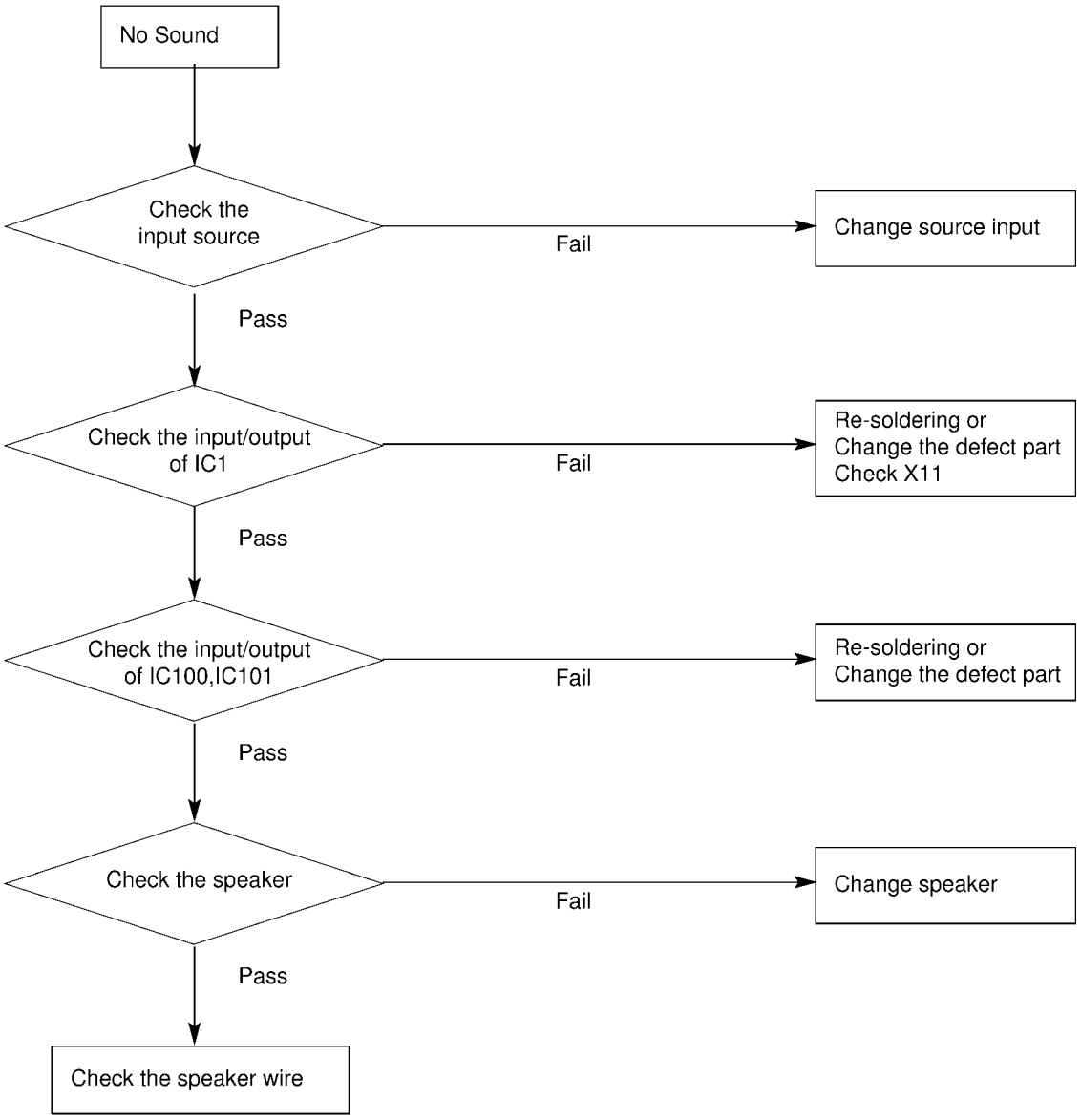
TROUBLESHOOTING



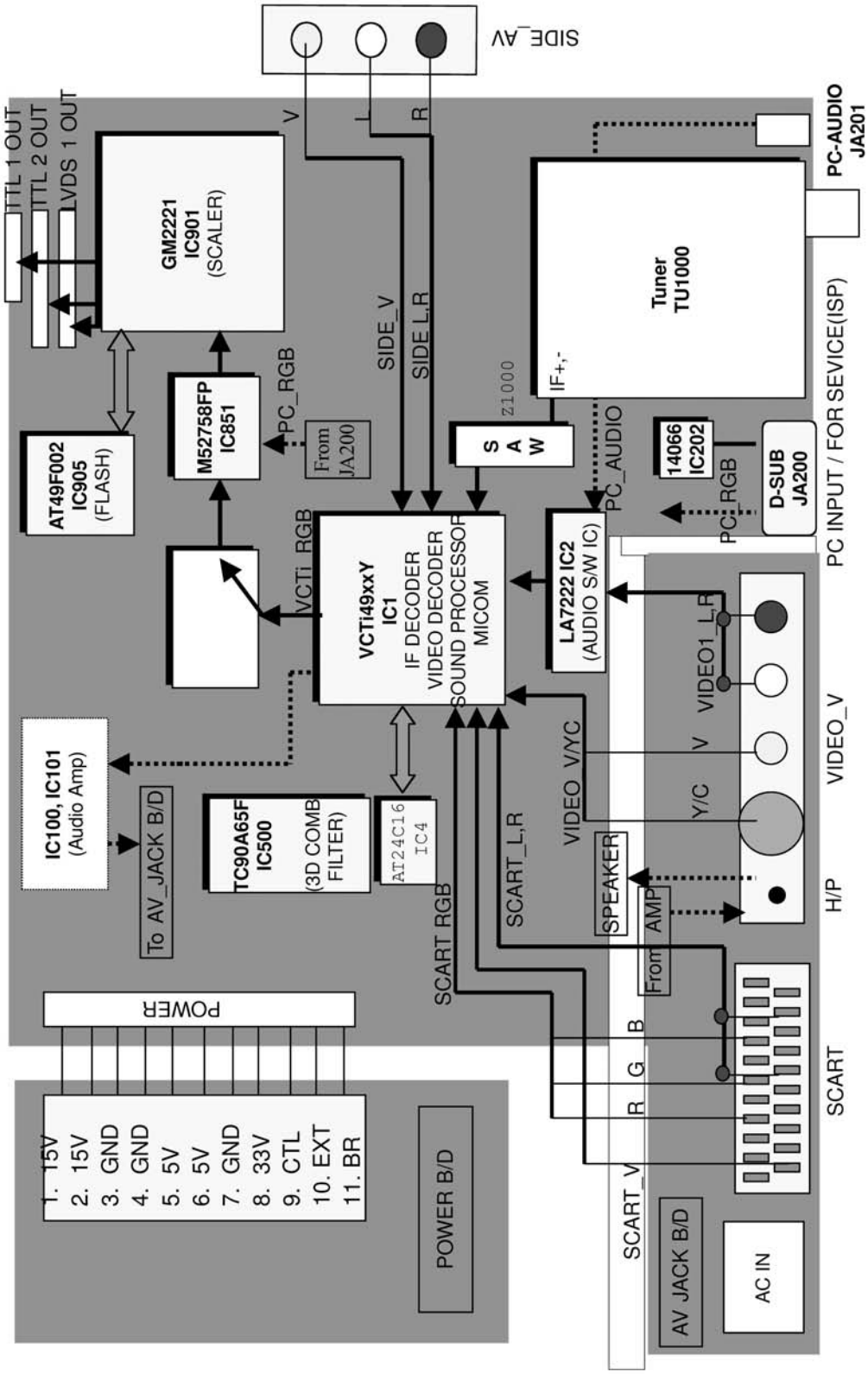

No Raster
:[B]Process
Check LED Status on display unit
Fail
Repeat A PROCESS
Check L900,L901 L902,L903
Fail
Change L900,L901, L902,L903
Pass
Check the input/ Output of IC901
Fail
Change IC901
Pass
Check inverter Connector or inverter
Fail
Change inverter connector or inverter
Pass
Check panel link Cable or module
Fail
Change panel link cable or module
Pass
Check input source cable and jack
Fail
Change module


No Raster on Component signal
Repeat
[A] Process
Pass
Check the signal of
L1200, L1202, L1203
Fail
Check JA1200 or
RCA CABLE
Pass
Check the input/
output of IC1
Fail
Re-soldering or
Change the defect part,
Check X11
Check the input/output
of IC800, IC851
Fail
Re-soldering or
Change the defect part
Pass
Check the input/
output of IC901
Fail
Re-soldering or
Change the defect part,
Check X900
Pass
Check input source cable and jack


No Raster on AV Signal
(Video, S-Video)
No Raster on TV(RF) signal
Repeat
[A] Process
Fail
Check the output of
TU1000
Fail
Check 5V, 33V of TU1000
Re-soldering or
Change the defect part
Pass
Check the signal of
L1209, L1210, L1212
Fail
Change L1209, L1210,
L1212
Pass
Check the input/output
of IC1
Fail
Re-soldering or
Change the defect part
Chek X11
Pass
Check the input/output
of IC800, IC851
Fail
Re-soldering or
Change the defect part
Pass
Check the input/output
of IC901
Fail
Re-soldering or
Change the defect part
Check X900
Pass
Check input source cable and jack


No Sound
Check the input source
Fail
Change source input
Pass
Check the input/output of IC1
Fail
Re-soldering or Change the defect part Check X11
Pass
Check the input/output of IC100,IC101
Fail
Re-soldering or Change the defect part
Pass
Check the speaker
Fail
Change speaker
Pass
Check the speaker wire

BLOCK DIAGRAM



BLOCK DIAGRAM DESCRIPTION

1. Video Controller Unit & Display Data Conversion Unit

The video controller unit receives the video signals inputted through the tuner, AV port (AV1, AV2, S-Video, component), and converts them into an analog RGB signal through the microcomputer (VCTI) combined with the video decoder that integrates various functions in one chip.

Either the analog RGB, component YPbPr or PC RGB signal is selected by the switching IC and inputted to a scaler (GM2221), which is sent to the LCD module after being modified to an LVDS signal through the integrated LVDS IC.

Or, it is sent to the LCD module as a TTL output.

VCTi is the main microprocessor that handles video signal processing and sound signal processing. It also manages the RF signals received from the tuner.

The scaler can control timing to fit into the LCD panel, and can also control the size and position of the input signal.

2. Power Supply Unit

The power supply unit provides 15V and 5V DC power to the mainboard.

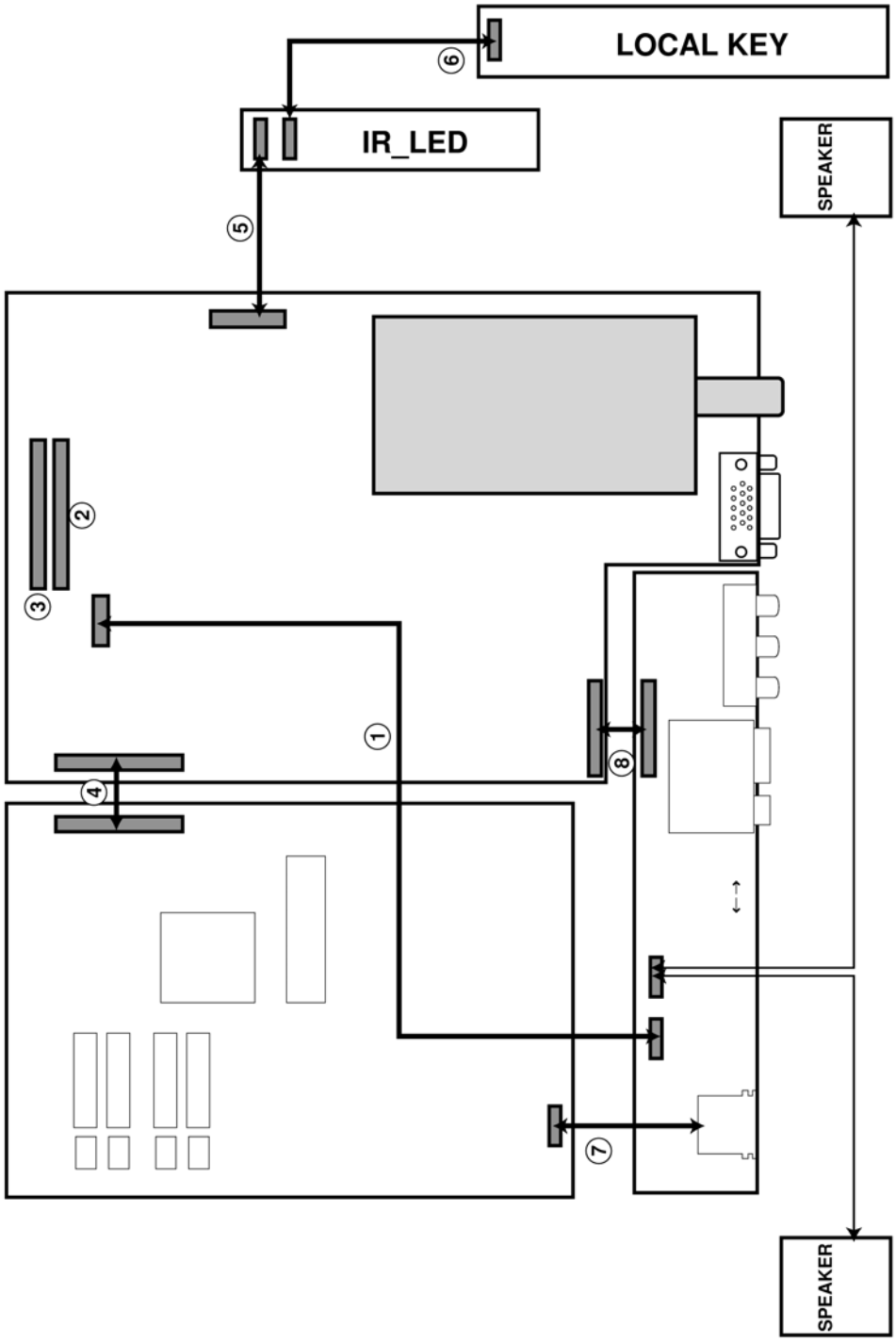
The PWM Step-Up DC/DC Converter circuit is used to generate the 33V used for the tuner.

15V power is directly used by the sound amplifier IC and is also used to generate 5V power through the regulator. 12V power is used for the LCD panel power, and 5V power is converted to 3.3V and 1.8V power through the regulator, which in turn supplies electrical power for ICs such as VCTI and scaler.

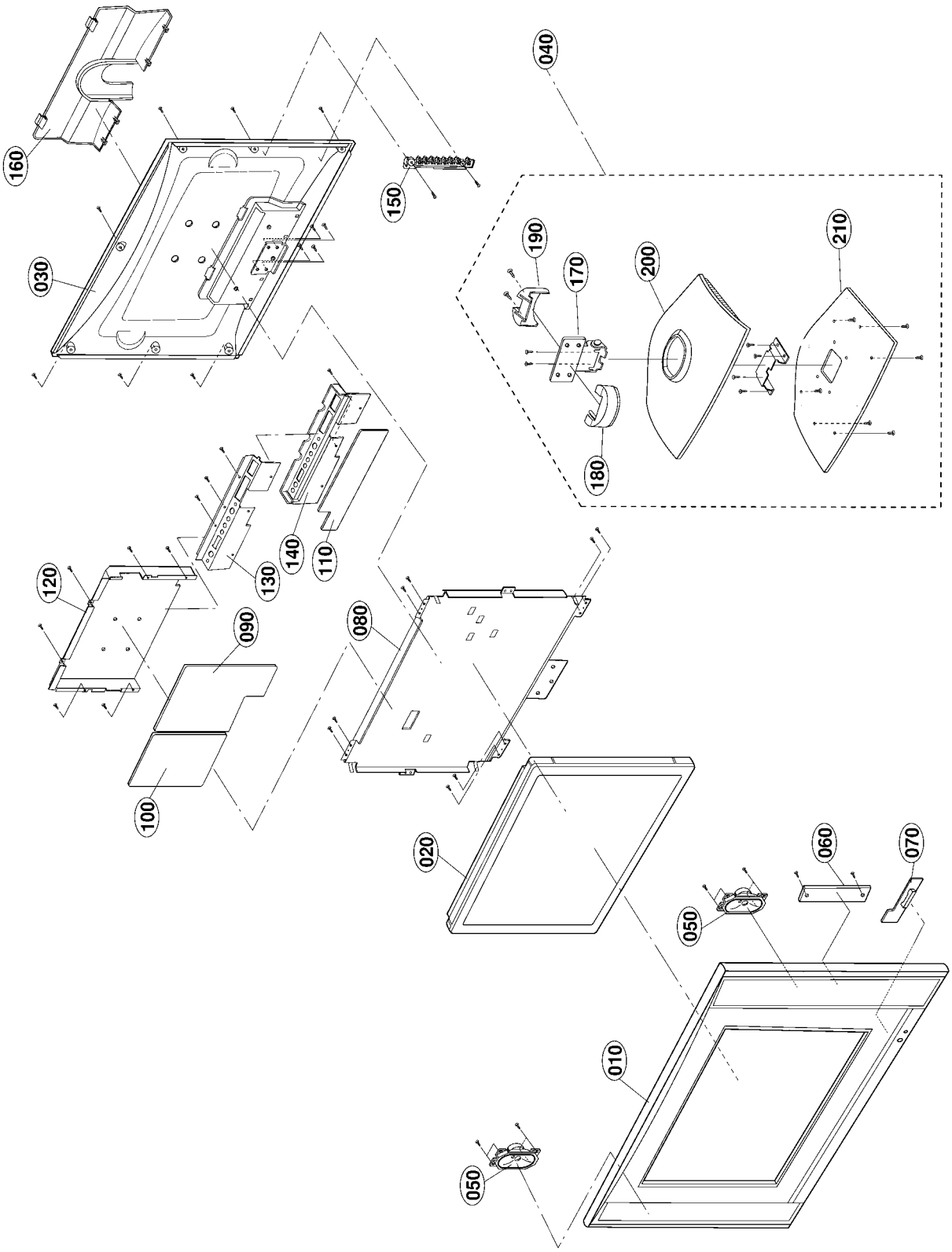
WIRING DIAGRAM

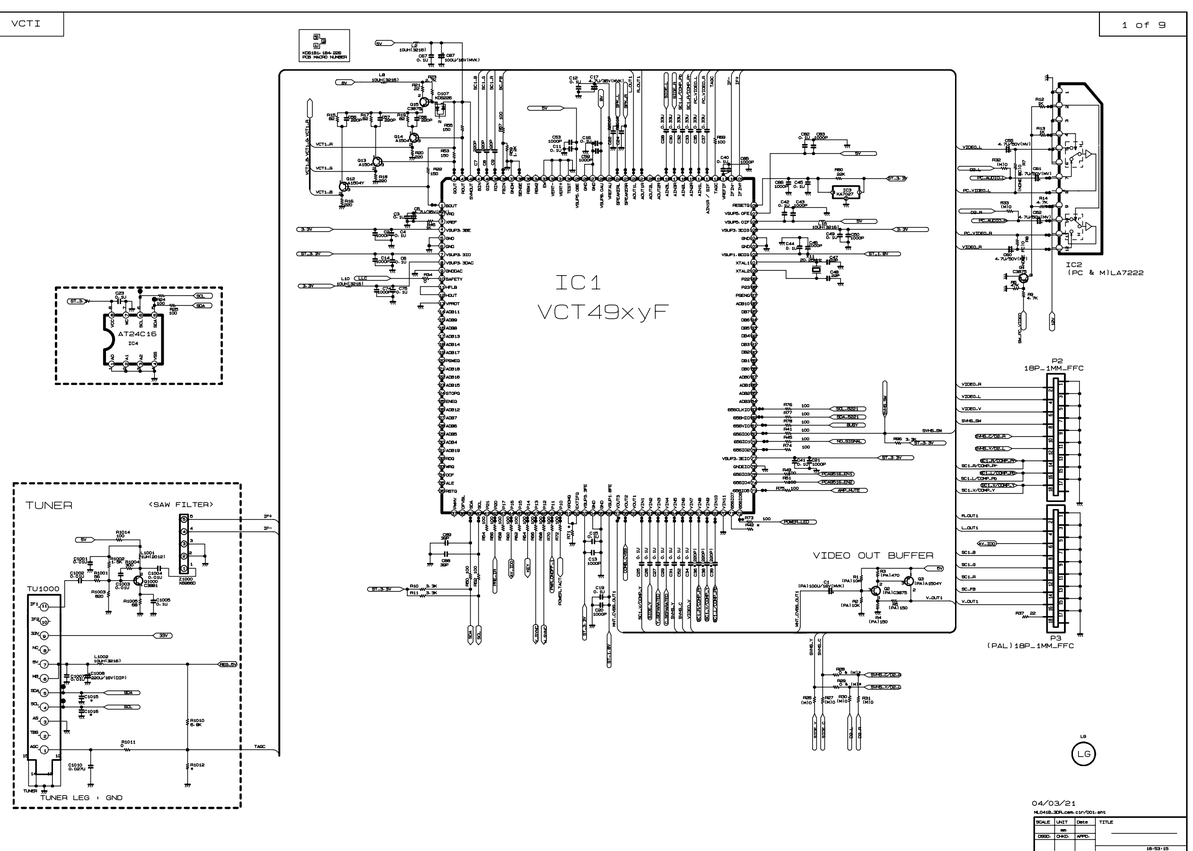
Wiring Part List

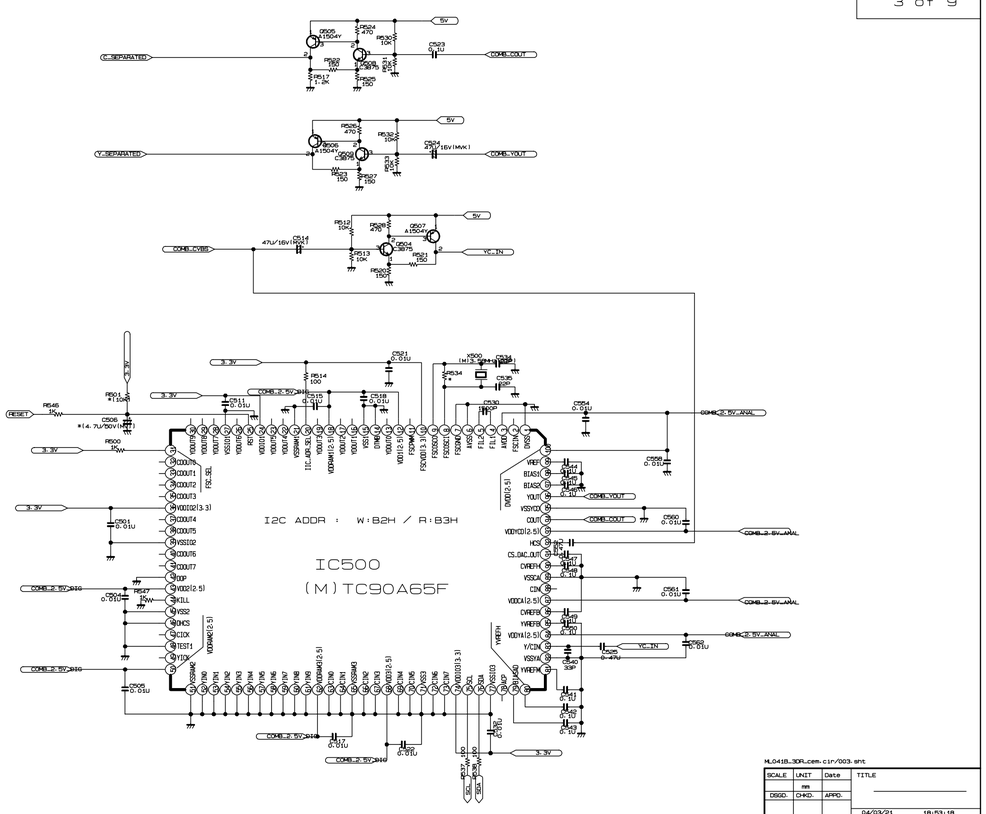
No.	Part No.
1	6631T25019Y
2	6631T11017P-***CMO***
3	6631T11021A-***LPL***
4	6631T20028G
5	6631T20033W
6	6631T25021F
7	6620K00007C
	or 6620K00007A
8	6631T11017R

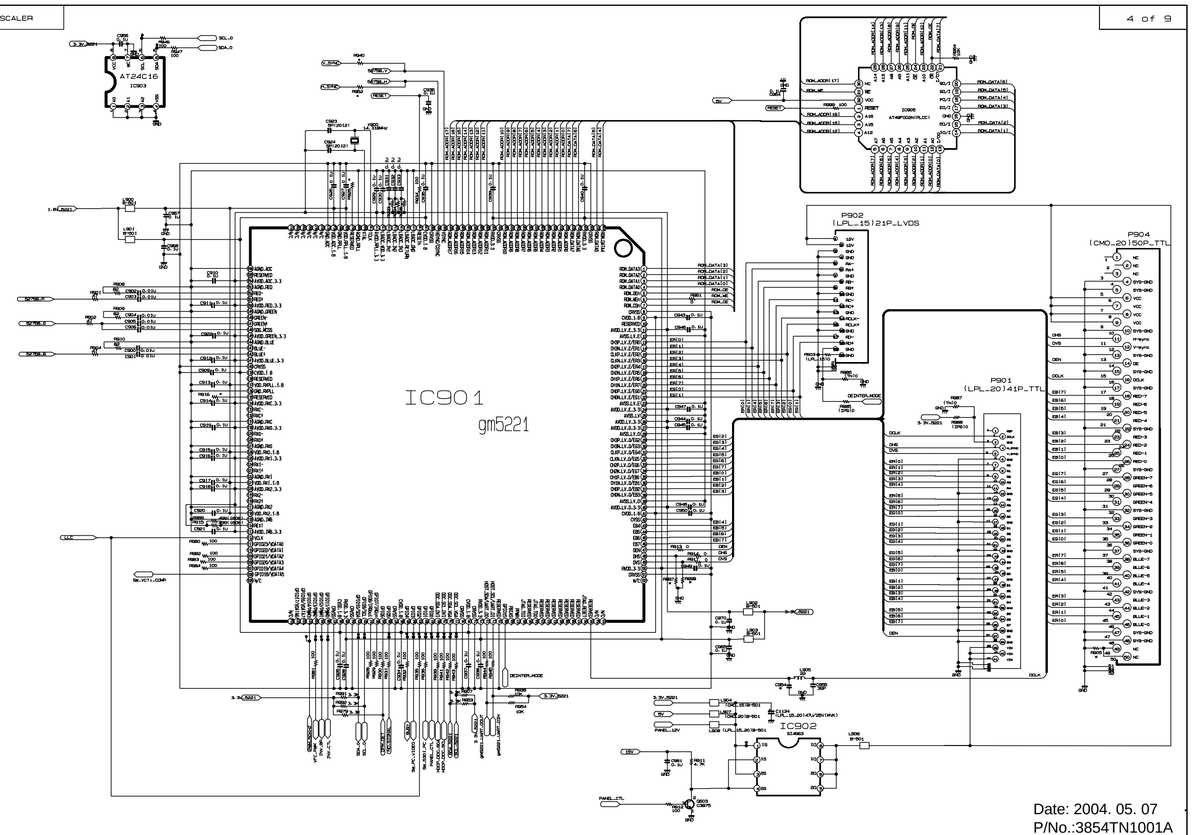


EXPLODED VIEW









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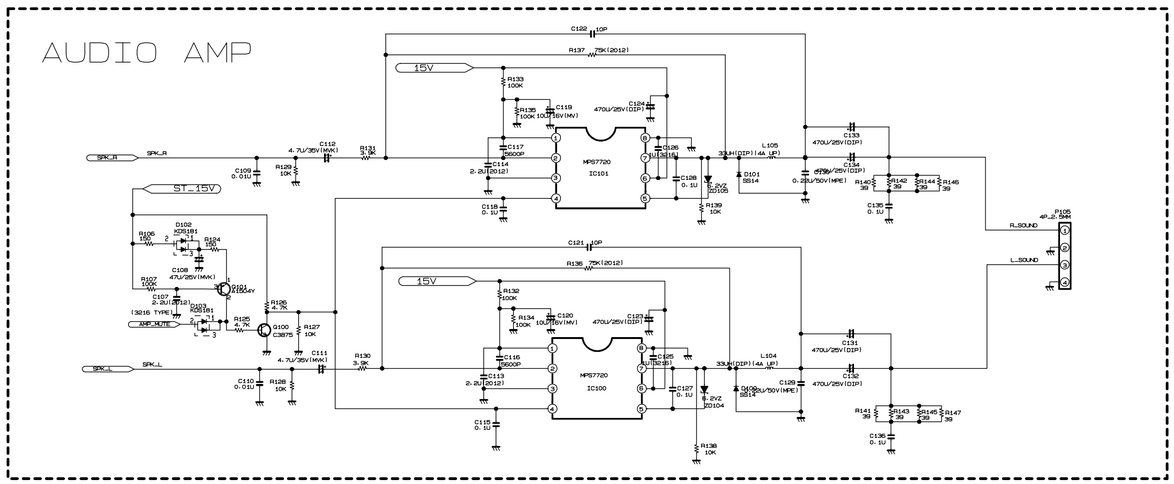

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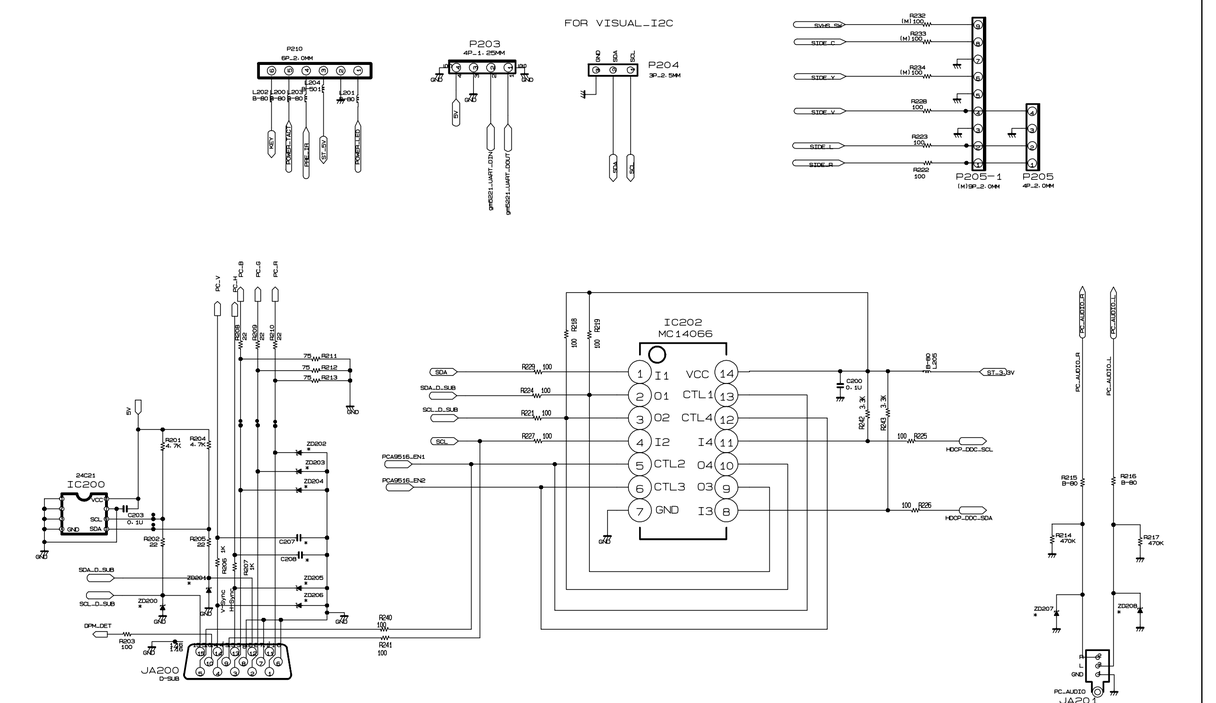

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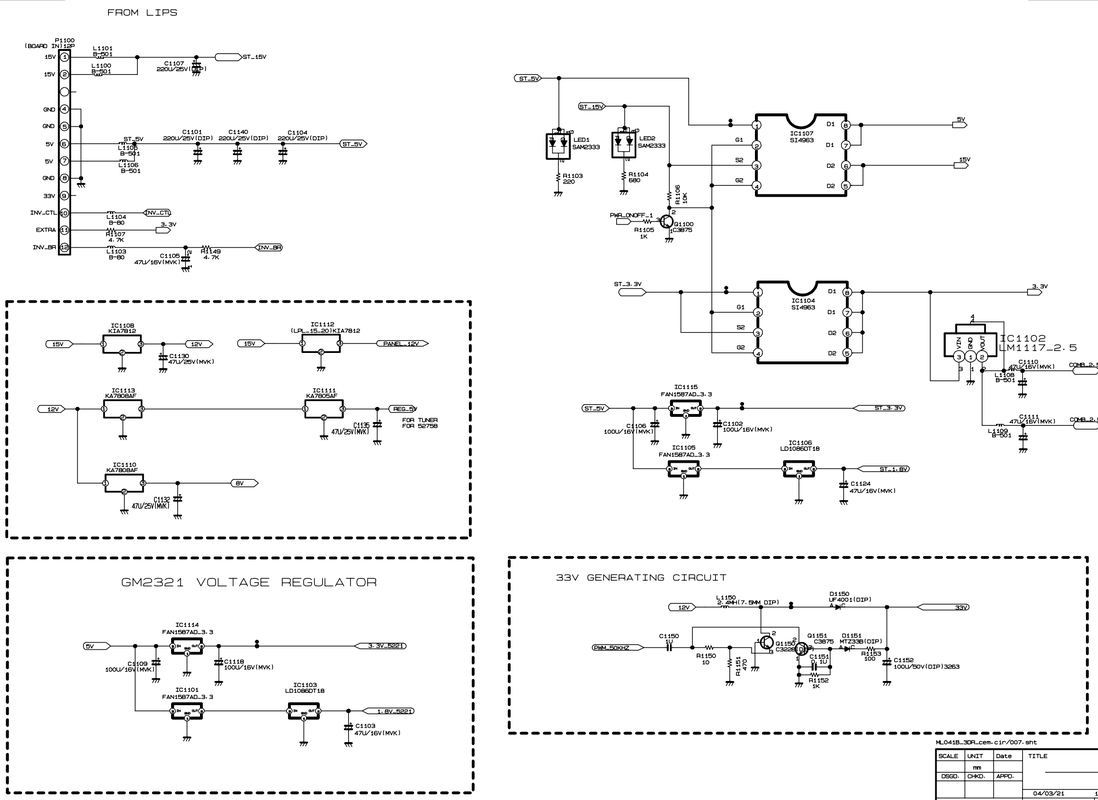

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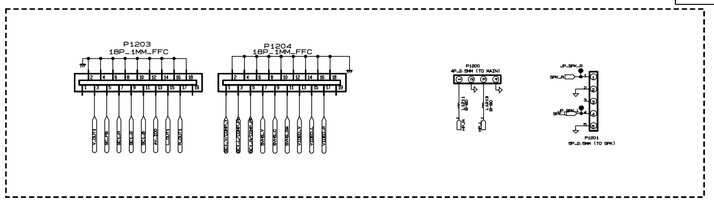
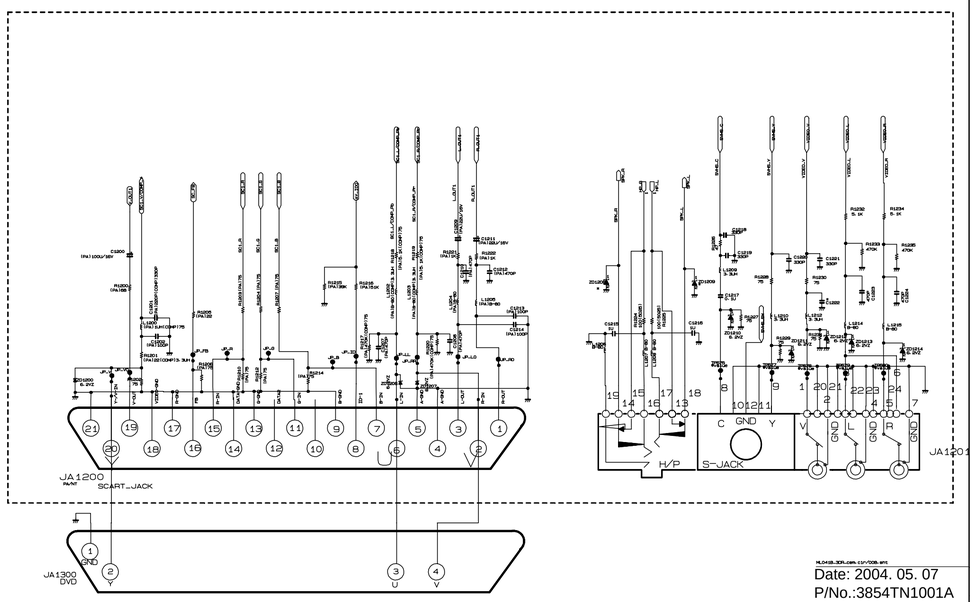
#AV BOARD#





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